Reversible Barriers (ReBar)

Tom McCreery

Program Manager, Special Projects Office

Approved for Public Release, Distribution Unlimited

Military Need

Problem

- Barriers
  - Indoor - direct access to doorways & hallways during
    - Hostage rescue
    - Building clearing operations
  - Outdoor – close-off roadways & control enemy troop movement
- Existing Solutions are NOT Ideal
  - Require considerable time of formation or emplacement
  - Require heavy logistical support
  - Must be manually attached to surfaces
  - Cannot be reversed easily
  - Existing barriers
    - Concrete road barricades
    - Plywood barrier for doors & windows

Approved for Public Release, Distribution Unlimited

Reversible Barriers Enable Tactical Flexibility

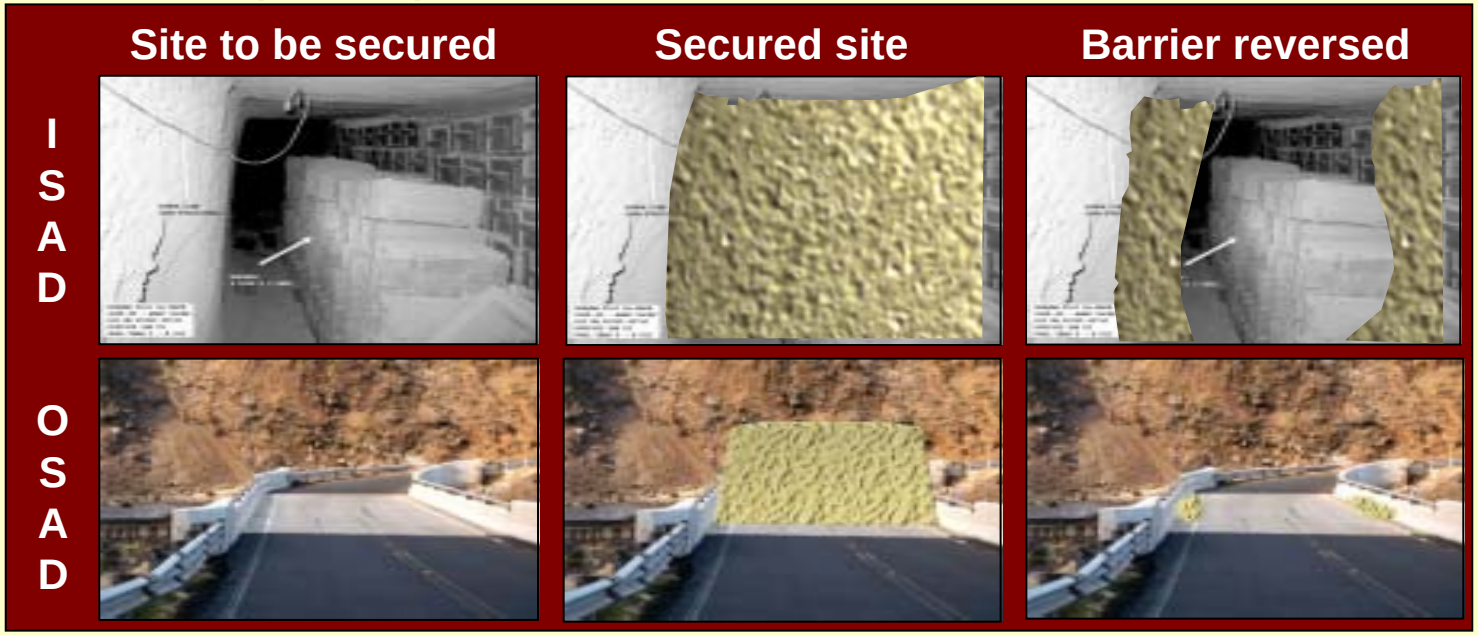
- Notional solution
  - Develop lightweight, reversible barriers to allow for tactical flexibility

- Military Impact
  - Indoors
    - Easily restrict access into and out-of buildings
    - Quick reversibility ensures backup means for egress should primary methods be obstructed
  - Outdoors
    - Block and secure roads and bridges with minimum personnel and equipment
    - Isolation of dangerous weapons for disposal at later times
    - Rapid reversibility enables immediate utilization of infrastructure and gear

Approved for Public Release, Distribution Unlimited

Reversible Barriers (ReBar)

- Program Goal
  - Develop portable, lightweight, reversible barriers for tactical flexibility consisting of an indoor site access denial (ISAD) and an outdoor site access denial (OSAD) barrier



- Operational Impact
  - Reversible barriers allow fluid US force movement through operations:
    - Urban combat
    - Ground intelligence
    - Reconnaissance
    - Hostage search and rescue
    - Surveillance

Approved for Public Release, Distribution Unlimited

ReBar Program Structure

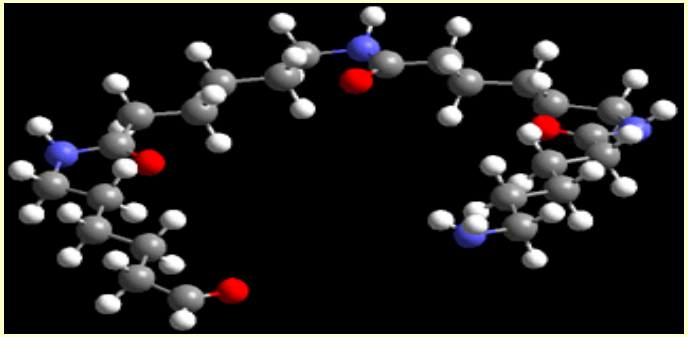
Phased development

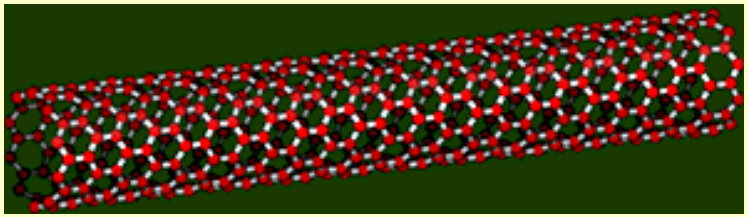
- –Phase I
  - Laboratory scale testing to demonstrate proposed technology overcoming technical challenging issues (TCIs)
- –Phase II
  - Evaluation on full-scale ISAD or OSAD test beds including structures:
    - – Doorways, hallways, windows, vent ducts
    - – Two-lane bridge with guardrails.
- –Phase III
  - Demonstrate the proposed barrier system at Military Operations in Urban Terrain (MOUT) site
- –Concepts to be tested at each phase at SwRI ReBar Testbed

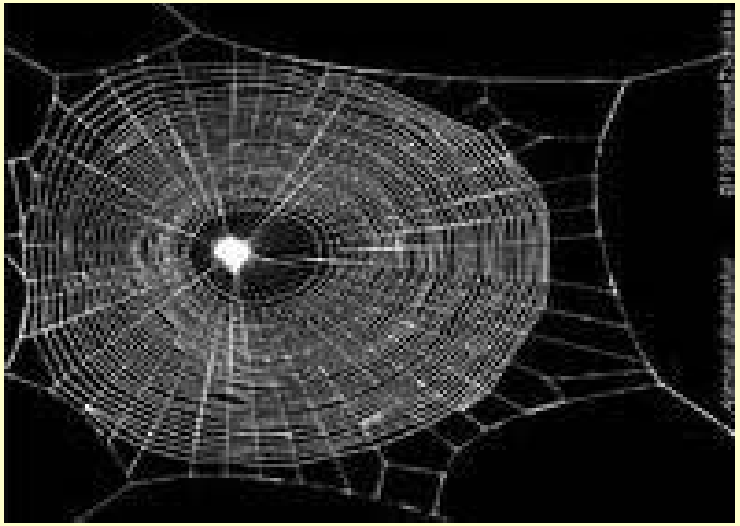
Approved for Public Release, Distribution Unlimited

Technologies for Notional Approach

- Ideal barrier is a complete system
- Potential barrier component approaches
  - Foams
    - Polymeric diphenylmethane diisocyanate (PMDI)
    - Polyurethane
    - Other polymers
  - Composite materials
    - Ceramics
    - Carbon nanotubes
  - Inflatable structures
    - Rigidized inflatables
  - Electrospun polymers – synthetic silk
  - Kevlar mesh
    - Currently used in ballistic protective systems
  - Combinations of above technologies

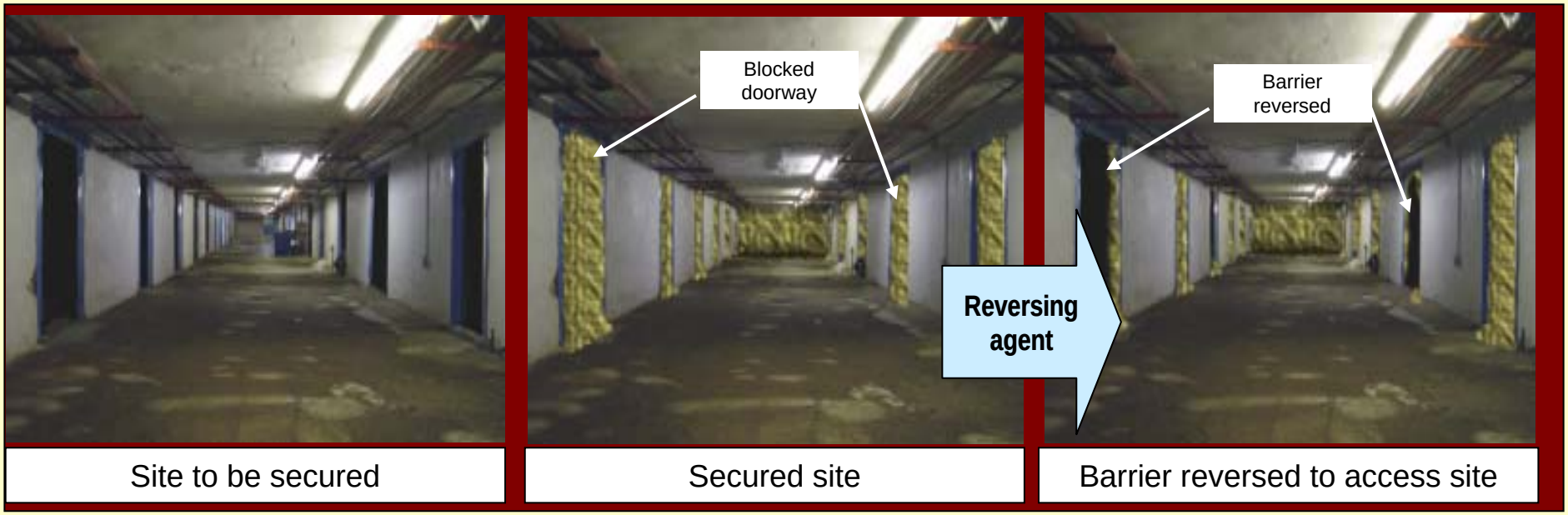






Indoor Site Access Denial Barrier

- Need: There is a need to control access to doorways and hallways during hostage rescue and building clearing operations



- Desired barrier characteristics presented to potential performers:
  - Strong barrier remains intact when subjected to forces exerted by a fully equipped infantryman
  - Lightweight portable barrier components for easy transport to remote locations
  - Fast reversibility with reversing agents available only to US troops

Approved for Public Release, Distribution Unlimited

Outdoor Site Access Denial Barrier

- Need: There is a need to control access to streets and alleyways to control access during hostage rescue and other urban operations

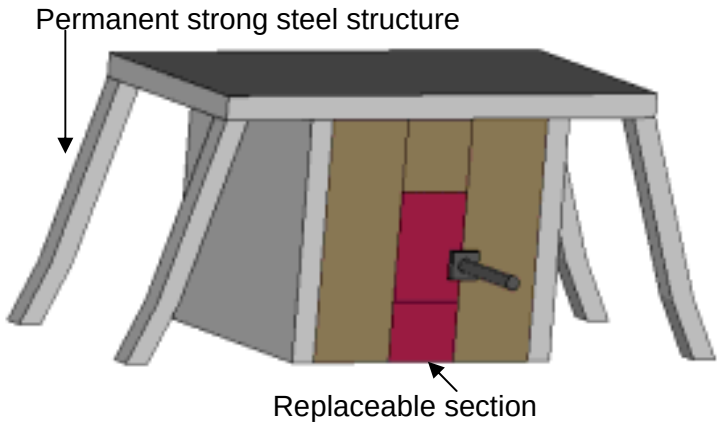
- Desired barrier characteristics presented to potential performers:
  - Strong barrier remains intact when subjected to forces exerted by a fully lightweight truck
  - Lightweight portable barrier components for easy transport to remote locations
  - Fast reversibility with reversing agents available only to US troops

Approved for Public Release, Distribution Unlimited

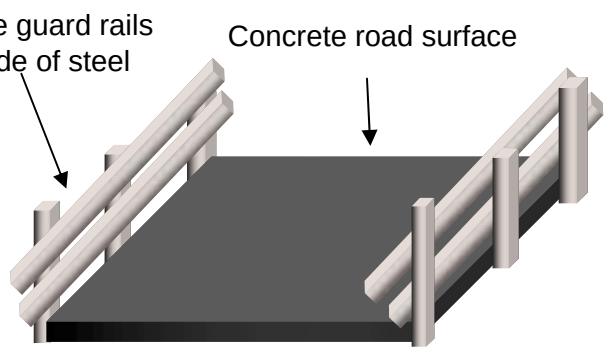
Barrier Integrity Verification

- Testbed at Southwest Research Institute (SwRI)
- Independent government testing facility

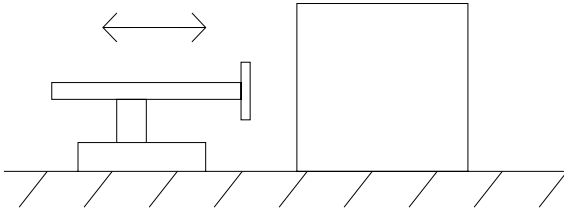
ISAD Testbed



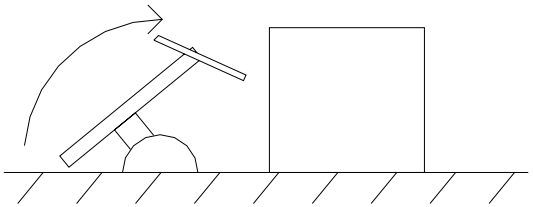
OSAD Testbed



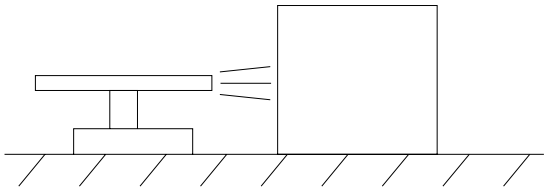
- The SwRI testbed will have multiple testing capabilities



Battering Ram



Cutter/ Guillotine



Flame Thrower/ Chemical Sprayer

Approved for Public Release, Distribution Unlimited